Paper No. 27

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ROBIN CHEUNG, YEZDI DORDI
and JENNIFER TSENG

Appeal No. 2003-0636
Application No. 09/599,125

ON BRIEF

Before KIMLIN, WALTZ and DELMENDO, Administrative Patent Judges.

KIMLIN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1-8, 10-19 and 25-31. Claim 1 is illustrative:

1. A method for processing a substrate surface, comprising:

planarizing a substrate surface comprising a conductive material; and

forming a metal-containing layer on the substrate surface during substrate cleaning with a cleaning composition comprising an electroless plating solution.

In the rejection of the appealed claims, the examiner relies upon the following references:

Mallory, Jr. (Mallory)	4,232,060	Nov. 04, 1980
Kobayashi et al. (Kobayashi)	4,368,223	Jan. 11, 1983
Reynolds	5,904,827	May 18, 1999

Sergey D. Lopatin et al. (Lopatin), "Thin Electroless Barrier for Copper Films," 3508 MULTILEVEL INTERCONNECT TECHNOLOGY II, Proceedings of SPIE 65-77 (September 23-24, 1998)

As is quite evident from illustrative claim 1, appellants' claimed invention is directed to cleaning and electrolessly plating a planarized substrate with one solution. According to appellants, "the electroless plating solution serves a dual purpose of substrate cleaning as well as formation of a metal-containing layer" (page 2 of principal brief, last paragraph).

Appealed claims 1-4, 7, 10-13 and 16-19 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Lopatin. The appealed claims also stand rejected under 35 U.S.C. § 103 as follows:

(a) claims 1-4, 7, 10-13, 16-19 and 25 over Mallory in view of Lopatin;

(b) claims 5, 8, 14 and 26-31 over Mallory in view of Lopatin and Reynolds;

(c) claims 6 and 15 over Mallory in view of Lopatin and Kobayashi.

We have thoroughly reviewed the respective positions advanced by appellants and the examiner. In so doing, we agree

with appellants that the examiner's § 102 rejection is not well-founded. However, we agree with the examiner that the claimed subject matter of claims 5, 6, 8, 14, 15 and 26-31 would have been obvious to one of ordinary skill in the art in view of the applied prior art. Accordingly, with the exception of the rejection over Mallory in view of Lopatin, we will sustain the examiner's § 103 rejections.

We consider first the examiner's rejection under § 102 over Lopatin. The examiner appreciates that "Lopatin does not specifically teach cleaning with a cleaning solution comprising an electroless plating solution" (page 4 of Answer, first paragraph). The examiner reasons, however, that since "Lopatin performs the same planarizing and electroless plating solution application, as claimed by the appellant, it would have been expected that it would have also inherently had the claimed cleaning properties" (id.).

The flaw in the examiner's reasoning is that he has failed to set forth reasoning to support the inevitability of the inherency which he propounds. It is not enough that Lopatin may possibly or probably clean the substrate during electroless plating, it is necessary that the examiner establish that the Lopatin process necessarily results in cleaning during the

plating step. In the present case, the examiner has failed to demonstrate that the methods employed by appellants and Lopatin are so similar that one would reasonably expect that the plating process of Lopatin also accomplishes cleaning. Since appellants disclose the use of spraying or megasonic energy to effect cleaning during the plating step, and Lopatin only discloses the use of a plating bath, there is no factual basis for concluding that the plating of Lopatin also achieves cleaning.

We will also not sustain the examiner's § 103 rejection over the combination of Mallory and Lopatin. Mallory, like Lopatin, uses only a plating bath with no disclosure of employing megasonic energy. Consequently, for the reasons discussed above, there is no reason to think that the combined teachings of Mallory and Lopatin would result in cleaning of the substrate during the plating operation.

The § 103 rejections over Mallory in view of Lopatin and Reynolds and Mallory in view of Lopatin and Kobayashi are another matter. As explained by the examiner, Reynolds discloses that it was known in the art to use megasonic energy to clean semi-conductor wafers, and Reynolds employs megasonic energy during electroless plating "to achieve coatings of high uniformity across the surface of a substrate" (column 3, lines 66-67).

Accordingly, we concur with the examiner that it would have been obvious for one of ordinary skill in the art to incorporate megasonic energy in the plating process of Lopatin in order to achieve a highly uniform coating, while also reasonably expecting that the megasonic energy would also provide additional cleaning to the substrate. We are not persuaded by appellants' argument that "*Reynolds* teaches that megasonic energy is used in combination with other components to ensure uniform plating" (page 4 of Reply Brief, second paragraph). We find that one of ordinary skill in the art would have reasonably expected that the use of megasonic energy even without the rotary wiper of Reynolds would provide an improvement in coating uniformity. In any event, the claims on appeal, due to the "comprising" language, do not preclude the use of Reynolds' rotary wiper in addition to megasonic energy.

As for the § 103 rejection based on the additional teaching of Kobayashi, the reference provides the relevant teaching that "[t]he typical process for preparing a nickel layer on the substrate is a process for spraying or coating a chemical nickel plating solution . . ." (column 1, lines 63-65). Accordingly, there is factual basis for the examiner's conclusion that it was obvious for one of ordinary skill in the art to apply a plating

solution via spraying. As a result, we agree with the examiner that utilizing the spraying technique disclosed by Kobayashi would have inherently produced some degree of cleaning of the substrate, which is all that is required by the appealed claims. We find no merit in appellants' argument that the electroless plating of Kobayashi is performed on a glass substrate. In our view, Kobayashi establishes that the spraying of an electroless plating solution was conventional in the art, and appellants have not argued otherwise.

Concerning the § 103 rejections, we note that appellants base no argument upon objective evidence of nonobviousness, such as unexpected results, which would serve to rebut the inference of obviousness established by the applied references.

Under the provisions of 37 CFR § 1.196(b), we enter the following new ground of rejection. Claims 1-4, 7, 10-13, 16-19 and 25 are rejected under 35 U.S.C. § 103 as being unpatentable over the collective teachings of Lopatin, Mallory, Reynolds and Kobayashi. From our discussion above, it is apparent that it is our opinion that it would have been obvious for one of ordinary skill in the art to employ the megasonic energy disclosed by Reynolds and the spraying technique taught by Kobayashi in the electroless plating processes of Lopatin and Mallory. As

explained above, we find that one of ordinary skill in the art would have had the requisite motivation to use megasonic energy with a reasonable expectation of effecting a uniform coating as well as cleaning of the substrate. As for the spraying technique of Kobayashi, it is our view that cleaning the substrate would be an inevitable or inherent result of applying the electroless plating solution to the substrate.

In conclusion, based on the foregoing, the examiner's § 102 rejection is reversed, as is the examiner's § 103 rejection over Mallory in view of Lopatin. The examiner's § 103 rejections over Mallory in view of Lopatin and Reynolds, and over Mallory in view of Lopatin and Kobayashi, are sustained. A new ground of rejection is entered under 35 U.S.C. § 103 for claims 1-4, 7, 10-13, 16-19 and 25 over the combined teachings of Lopatin, Mallory, Reynolds and Kobayashi. Accordingly, the examiner's decision rejecting the appealed claims is affirmed-in-part and a new ground of rejection has been entered under 37 CFR § 1.196(b).

In addition to affirming the examiner's rejection of one or more claims, this decision contains a new ground of rejection pursuant to 37 CFR § 1.196(b). 37 CFR § 1.196(b) provides, "[a] new ground of rejection shall not be considered final for purposes of judicial review."

Regarding any affirmed rejection, 37 CFR § 1.197(b) provides:

> (b) Appellant may file a single request for rehearing within two months from the date of the original decision . . . .

37 CFR § 1.196(b) also provides that the appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of proceedings (37 CFR § 1.197(c) as to the rejected claims:

> (1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner . . . .
>
> (2) Request that the application be reheard under § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record . . . .

Should the appellant elect to prosecute further before the Primary Examiner pursuant to 37 CFR § 1.196(b)(1), in order to preserve the right to seek review under 35 U.S.C. §§ 141 or 145 with respect to the affirmed rejection, the effective date of the affirmance is deferred until conclusion of the prosecution before the examiner unless, as a mere incident to the limited prosecution, the affirmed rejection is overcome.

If the appellant elects prosecution before the examiner and this does not result in allowance of the application, abandonment or a second appeal, this case should be returned to the Board of Patent Appeals and Interferences for final action on the affirmed rejection, including any timely request for reconsideration thereof.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART - 37 CFR § 1.196(b)

EDWARD C. KIMLIN Administrative Patent Judge	)	
THOMAS A. WALTZ Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
ROMULO H. DELMENDO Administrative Patent Judge	)	

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